

Amendment  
Serial No. 10/531,722  
Attorney Docket No. 052465

### AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application:

#### LISTING OF CLAIMS:

1. (Currently amended): An ignition device for internal combustion engine, containing:
  - a main chamber designed for including a main combustible mixture, and fitted with a compression system of said mixture,
  - an igniter containing a precombustion chamber designed for receiving reactants and an ignition system of the reactants contained in the precombustion chamber, said precombustion chamber being defined by a precombustion chamber body having a head including at least one passageway, said head of the precombustion chamber body separating the precombustion chamber from the main chamber and communicating the precombustion chamber and the main chamber by dint of the passageway(s),  
~~characterised in that~~ wherein said precombustion chamber body is made of a material selected among copper alloys and having a thermal conductivity at 20°C of at least 10 W/K/m.
2. (Currently amended): An ignition device according to claim 1, wherein said precombustion chamber body is made of a material having a thermal conductivity at 20°C of at least 30 W/K/m, ~~preferably of at least 50 W/K/m.~~
3. (Previously presented): An ignition device according to claim 1, wherein said precombustion chamber body is made of a material having a thermal conductivity at 20 °C smaller than or equal to 350 W/K/m.

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4. (Canceled)

5. (Currently amended): An ignition device according to claim [[4]] 1, wherein the material forming the precombustion chamber body according to the invention is selected among binary brasses, copper-nickel, copper-aluminium and copper-nickel-zinc alloys.

6. (Currently amended): An ignition device according to claim 5, wherein the material forming the precombustion chamber body according to the invention is selected among the alloys CuZn5, CuZn10, CuZn15, CuZn20, CuZn30, CuZn33, CuZn36, CuZn37, CuZn40, CuNi44Mn, CuNi5Fe, CuAl5, CuAl6, CuAl10Fe5Ni5, CuNi10Zn27, CuNi12Zn24, CuNi15Zn21, CuNi18Zn20, CuNi18Zn27, CuNi10Zn42Pb2 and CuNi18Zn19Pb1, preferably the alloy CuZn5.

7. (Currently amended): An ignition device according to claim [[4]] 1, wherein the material forming said precombustion chamber body is CuCr1Zr.

8. (Previously presented): An ignition device according to claim 1, wherein said passageway(s) are of cylindrical shape and of diameter greater than 1 mm.

9. (Currently amended): An ignition device according to claim 1, wherein said passageway(s) ~~(15)~~ are capable of preventing the propagation of a flame front while enabling the propagation of unstable compounds derived from the combustion of the reactants contained in the precombustion chamber, the compression system of the main chamber and the seeding of the main mixture with said unstable compounds enabling mass self-ignition of the main mixture.

10. (Previously presented): An ignition device according to claim 9, wherein said passageway(s) are of cylindrical shape and of diameter smaller than or equal to 1 mm.

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11. (Previously presented): An ignition device according to claim 9, wherein said passageway(s) have a length smaller than or equal to the diameter thereof.

12. (Previously presented): An ignition device according to claim 9, wherein

- the upper section of the precombustion chamber body, not adjoining the main chamber, is in the form of a cylinder of inner diameter  $\Phi$ , and
- the head of the precombustion chamber body comprises several passageways, said passageways being circumscribed by a circular curve of diameter  $d_2$  running through the centres of the outermost passageways, the ratio  $d_2/\Phi$  being smaller than or equal to 0.5.

13. (Previously presented): An ignition device according to claim 12, wherein the ratio  $d_2/\Phi$  is smaller than or equal to 1/3.

14. (Previously presented): An ignition device according to claim 12, wherein the centre of the curve running through the centres of the outermost passageways is situated on the axis symmetry of the precombustion chamber.

15. (Currently amended): An ignition device according to claim 12, wherein the centre of the curve running through the centres of the outermost passageways is situated at a distance  $d_3$  from the axis symmetry of the precombustion chamber, said distance  $d_3$  being equal to or greater than the a quarter of the diameter  $\Phi$  of the precombustion chamber.

16. (Currently amended): An igniter for internal combustion engine containing a precombustion chamber defined by a precombustion chamber body having a head fitted with at least one passageway, the precombustion chamber being designed for including a combustible mixture, and an ignition system of the combustible mixture contained in the precombustion

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chamber, wherein the precombustion chamber body is made of a material selected from copper alloys and having a thermal conductivity greater than 10 W/K/m.

17. (Currently amended): An igniter according to claim 16, wherein said precombustion chamber body is made of a material having a thermal conductivity greater than 10 W/K/m; ~~preferably greater than 30 W/K/m.~~

18. (Previously presented): An igniter according to claim 16, wherein said precombustion chamber body is made of a material having a thermal conductivity smaller than or equal to 350 W/K/m.

19. (Canceled)

20. (Currently amended): An igniter according to claim ~~[[19]]~~ 16, wherein the material forming said precombustion chamber body is selected among the binary brasses, copper-nickel, copper-aluminium and copper-nickel-zinc alloys.

21. (Currently amended): An igniter according to claim 20, wherein the material forming said precombustion chamber body is selected among the alloys CuZn5, CuZn10, CuZn15, CuZn20, CuZn30, CuZn33, CuZn36, CuZn37, CuZn40, CuNi44Mn, CuNi5Fe, CuAl5, CuAl6, CuAl10Fe5Ni5, CuNi10Zn27, CuNi12Zn24, CuNi15Zn21, CuNi18Zn20, CuNi18Zn27, CuNi10Zn42Pb2 and CuNi18Zn19Pb1, ~~preferably the alloy CuZn5.~~

22. (Currently amended): An igniter according to claim ~~[[19]]~~ 16, wherein the material forming said precombustion chamber body is the alloy CuCr1Zr.

23. (New): An ignition device for internal combustion engine, containing:

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- a main chamber designed for including a main combustible mixture, and fitted with a compression system of said mixture,
- an igniter containing a precombustion chamber designed for receiving reactants and an ignition system of the reactants contained in the precombustion chamber, said precombustion chamber being defined by a precombustion chamber body having a head including at least one passageway, said head of the precombustion chamber body separating the precombustion chamber from the main chamber and communicating the precombustion chamber and the main chamber by dint of the passageway(s),

wherein said precombustion chamber body is made of a material having a thermal conductivity at 20°C of at least 10 W/K/m,

wherein said passageway(s) are capable of preventing the propagation of a flame front while enabling the propagation of unstable compounds derived from the combustion of the reactants contained in the precombustion chamber, the compression system of the main chamber and the seeding of the main mixture with said unstable compounds enabling mass self-ignition of the main mixture,

and wherein

- the upper section of the precombustion chamber body, not adjoining the main chamber, is in the form of a cylinder of inner diameter  $\Phi$ , and
- the head of the precombustion chamber body comprises several passageways, said passageways being circumscribed by a circular curve of diameter  $d_2$  running through the centres of the outermost passageways, the ratio  $d_2/\Phi$  being smaller than or equal to 0.5.

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24. (New): An ignition device according to claim 23, wherein the ratio  $d_2/\Phi$  is smaller than or equal to  $1/3$ .

25. (New): An ignition device according to claim 23, wherein the centre of the curve running through the centres of the outermost passageways is situated on the axis symmetry of the precombustion chamber.

26. (New): An ignition device according to claim 23, wherein the centre of the curve running through the centres of the outermost passageways is situated at a distance  $d_3$  from the axis symmetry of the precombustion chamber, said distance  $d_3$  being equal to or greater than a quarter of the diameter  $\Phi$  of the precombustion chamber.